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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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CANADA

EXAMINER

CREPEAU, JONATHAN

ART UNIT

PAPER NUMBER

1746

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/682,427

Applicant(s)

PREDIGER ET AL

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-940)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1-17. The claims remain rejected for the reasons of record. Accordingly, this action is made final.

Drawings

2. The drawing correction submitted on March 24, 2004 is approved. Corrected drawings incorporating the changes are required in reply to this Office action.

Claim Objections

3. Claim 13 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 13 recites that "the galvanic cell is another fuel cell." However, parent claim 12 already defines the galvanic cell as a battery. Thus, claim 13 fails to properly limit claim 12. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. Claims 1-4, 6-9, 11, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 7-6778 in view of Wilkinson et al (U.S. Patent 6,096,448).

Regarding claims 1, 7, and 16, JP '778 is directed to a system comprising a solid oxide fuel cell (S2) and a power source (S1) (see abstract). The power source applies a current to the fuel cell such that the applied current flows in the direction opposite to current flow during normal fuel cell operation (see abstract). This has the effect of reversing oxidation of the fuel cell anode (see paragraph 9 of the machine translation). Regarding claims 3, 11, and 13, the power source (S1) is another solid oxide fuel cell (see paragraph 13). Regarding claim 4, the applied voltage is maintained at a predetermined level (see paragraph 22). Regarding claims 6, and 14 the load (11) is disconnected from the fuel cell (S2) via switches (A3, A4) (see Fig. 3). Regarding claims 7, 8, 15, and 16, the system comprises means for applying the power source (i.e., disconnect box 13 and switches B1-B4). Regarding claim 9, the switches and disconnect box are controlled by a controller (see paragraph 12).

While the reference teaches that the external voltage may be applied "by artificial control at periodical or arbitrary stages" in paragraph 12, the reference does not expressly teach that the voltage is applied in response to the measured voltage output of the cell dropping below a predetermined level, as recited in claims 1, 7, and 16.

The patent of Wilkinson et al is directed to a method of fuel starving a solid polymer fuel cell to remove anode poisons. The frequency of the fuel starvation may be controlled in

response to a monitored parameter, such as cell voltage (see col. 4, lines 44-49, col. 7, lines 50-57).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosures of JP '778 and Wilkinson et al. would motivate the artisan to control the fuel cell of JP '778 in response to its measured output voltage. In paragraph 25, JP '778 teaches that "moreover, this energization processing also did so the effect of recovering the electromotive force of the cell which declined by prolonged operation." Thus, the purpose of the invention of JP '778 is to rejuvenate the anode so that the output voltage of the fuel cell is increased. Therefore, it would be obvious to apply the power source of JP '778 in response to a measured output voltage being below a set value (corresponding to a condition in which the anode is undesirably oxidized). The disclosure of Wilkinson et al. further indicates that such a measurement is a suitable way in which to control a fuel cell system wherein the goal is rejuvenation of the anode. Accordingly, the control of the fuel cell of JP '778 in response to a measured voltage would be obvious to the skilled artisan.

Regarding claims 2, 7, and 16, the artisan would find it obvious to use a voltmeter the measure the output voltage of the fuel cell. Such devices are well known for the purpose of measuring voltage and are widely available and inexpensive.

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '778 in view of Wilkinson as applied to claim 1-4, 6-9, 11, and 13-16 above, and further in view of Dudfield et al (U.S. Patent 5,601,936).

JP '778 teaches that the power source (S1) is another solid oxide fuel cell, but does not expressly teach that it may be a battery, as recited in claim 12.

The patent of Dudfield et al. is directed to a method of operating a fuel cell in which a DC potential is applied to the fuel cell by a battery (20) (see col. 3, line 21).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Dudfield et al. indicates that batteries are functionally equivalent to fuel cells when used as a power source to apply a voltage to a fuel cell. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06. Accordingly, use of a battery to apply an external voltage to the fuel cell of JP '778 would be obvious to the skilled artisan.

6. Claims 5, 10, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '778 in view of Wilkinson as applied to claim 1-4, 6-9, 11, and 13-16 above, and further in view of Mukerjee et al (U.S. Patent 6,620,535).

JP '778 does not expressly teach that the application of the external voltage is also controlled in response to a fuel pressure measurement, as recited in claims 5, 10, and 17.

The Mukerjee et al. patent is directed to strategies for preventing anode oxidation in solid oxide fuel cells. One such strategy is keeping a supply of reformat flowing to the anode so as to keep the anode in a reducing atmosphere (see col. 5, line 9, et seq.).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to control the power source of JP '778 based on the pressure of the fuel line. As disclosed by Mukerjee, when fuel is not present at the anode, rapid oxidation may occur. Thus, a fuel pressure sensor may be advantageously used to judge whether enough fuel is present at the anode of JP '778 to prevent anode oxidation. If there is not enough fuel present, then the method of JP '778 may be used to reverse the anode oxidation. Accordingly, the use of a pressure sensor in the system of JP '778 to measure the amount of fuel present at the anode would be obvious to a skilled artisan.

Response to Arguments

7. Applicant's arguments filed March 24, 2004 have been fully considered but they are not persuasive. Applicants generally assert that the Wilkinson reference cannot be combined with the JP '778 reference because the former is concerned with polymer exchange membrane fuel cells and the latter is concerned with solid oxide fuel cells. In particular, Applicants assert that "the teachings of Wilkinson cannot be applied to the present invention because a PEM fuel cell

cannot tolerate reversals of cell voltage [...] Whereas, in the present invention, it is the purpose of the invention to create prolonged cell reversal or large negative cell voltages for the purpose of protecting the integrity of the anode." In response, it is noted that PEM fuel cells can in fact tolerate cell reversals, albeit momentary ones. See col. 7, line 27 of Wilkinson. Therefore, the broad assertion that PEM fuel cells "cannot tolerate reversals of cell voltage" is not persuasive. Furthermore, these momentary cell reversals are described as beneficial in terms of rejuvenating the anode (see col. 7, line 32). It is further submitted that the references are properly combinable because although they employ different fuel cell types, both references are concerned with rejuvenation of anodes. As noted above, the disclosure of Wilkinson is merely relied upon as showing that a voltage-based control scheme is known, and the disclosure of JP '778, on its own merits, guides the artisan to perform a voltage-based control scheme.

Additionally, in response to the assertion that the object of the present invention is to create "prolonged" cell reversal, such limitation is not claimed. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, the term "prolonged," even if incorporated into the claims, could be considered to be a relative term that may not meaningfully limit the claimed invention.

Applicants further assert that "[i]n the present invention, the methods and systems claimed relate to prophylactic methods of preventing anode damage from oxidation. In other words, the references selected by the Examiner relate to treatment of a condition, whereas the present invention relates to prevention of the condition. Treatment does not necessarily teach

one skilled in the art the solution of prevention.” In response, it is noted that the reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); MPEP §2144. Accordingly, the references are still believed to fairly suggest the claimed subject matter, and as such, the rejections under 35 USC §103 are maintained.

Conclusion

8. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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Patent Examiner
Art Unit 1746
June 3, 2004